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Environmental Protection Agency

1972

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Over 10,000 spills occur annually in the United States. They are defined as noncontinuous discharges or dumping which occur as a result of accidents, malfunctions of equipment, human error, deliberate discharges of bilge or ballast water and convenience dumping of hazardous materials and oil into sewers, streams, estuaries, coastal waters, and upon land areas. Approximately 80 percent of the reported spills involve oil, including crude and petroleum products ranging from grease to gasoline and waste lubrication oil. It is estimated that over 30 million gallons of oil were discharged in 1972. The remaining 20 percent involve hazardous polluting substances other than oils, which include poisons, corrosive materials, oxidizing agents, radioactive materials, and other compounds and mixtures which severely affect the aquatic environment.

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OIL SPILLS

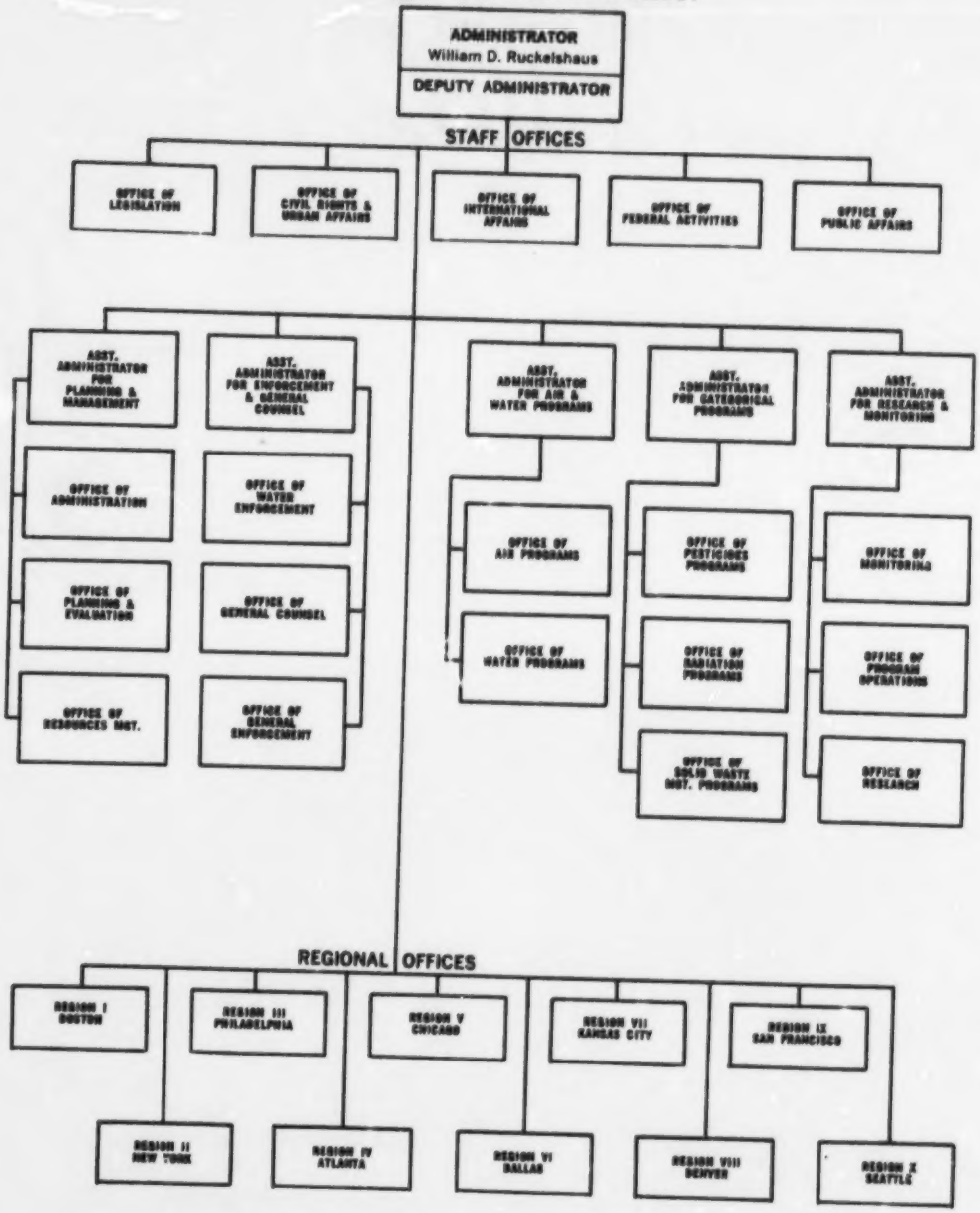
AND SPILLS OF HAZARDOUS SUBSTANCES

One of the major efforts of the Environmental Protection Agency is directed toward the problem of water-polluting spills of oil and hazardous substances. Both types have been the subject of Federal legislation and sharply increased world interest.

Over 10,000 spills occur annually in the United States. They are defined as noncontinuous discharges or dumping which occur as a result of accidents, malfunctions of equipment, human error, deliberate discharges of bilge or ballast water and convenience dumping of hazardous materials and oil into sewers, streams, estuaries, coastal waters, and upon land areas.

Approximately 80 percent of the reported spills involve oil, including crude and petroleum products ranging from grease to gasoline and waste lubricating oil. It is estimated that over 30 million gallons of oil were discharged in 1972. The remaining 20 percent involve hazardous polluting substances other than oils, which include poisons, corrosive materials, oxidizing agents, radioactive materials, and other compounds and mixtures which severely affect the aquatic environment.

ENVIRONMENTAL PROTECTION AGENCY



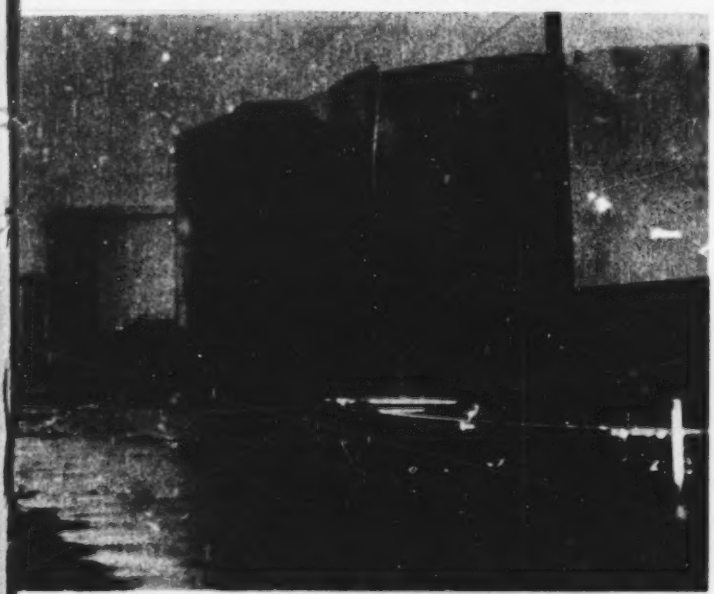
For both oil and hazardous materials the source of the discharges is linked to transport, transfer, storage, manufacturing and production operations. Oil terminals--tank storage farms and other facilities for storing oil--accidentally release oil to the environment. Spills also come from offshore platforms, tankers and other vessels, and from pipelines. There are, of course, many other sources of oil pollution.

Effective spill response, and workable prevention and enforcement measures are not easily achieved. Some lessons have been learned and some progress has been made in some areas as may be evident by reviewing a number of spills which have occurred in the past several years.

SOME OIL SPILL INCIDENTS

TANK FARM SPILL—1969

In 1969 an unfortunate oil spill at a large storage terminal in New Jersey began when a 10-year-old tank started to leak at the bottom. Soon the oil began to rush out creating a vacuum inside. The huge tank suddenly collapsed, and some 8,500,000 gallons of oil gushed from the bottom, splashed over the retaining dikes in a 10-foot wave and flowed into marshes, Smith Creek, the Arthur Kill and Raritan Bay.



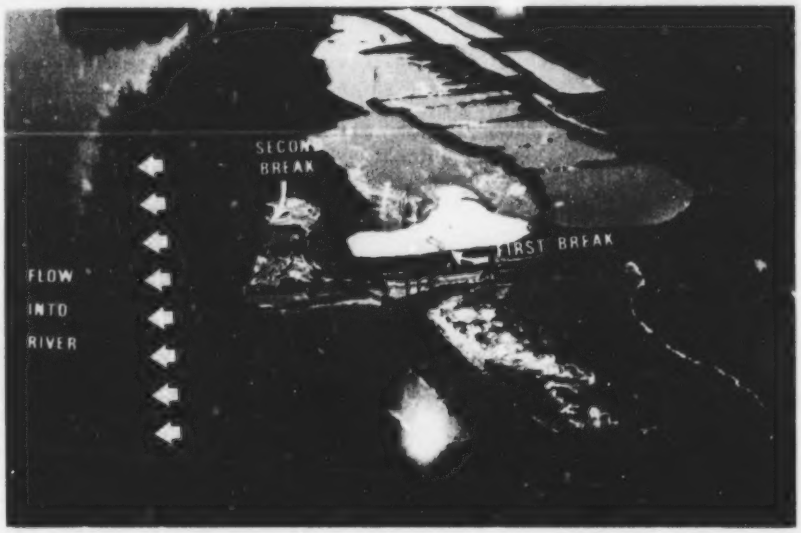
This tank leaked and imploded causing spill.

Before this spill, sewage, oil and industrial pollution had rendered the Arthur Kill devoid of almost all biological life. After the spill the ground in the area became so saturated with oil that shallow oil wells were drilled. Oil was pumped out of the ground and returned to the processing operation. At the time of the incident a major fire was averted by the efforts of the fire department and the oil company.

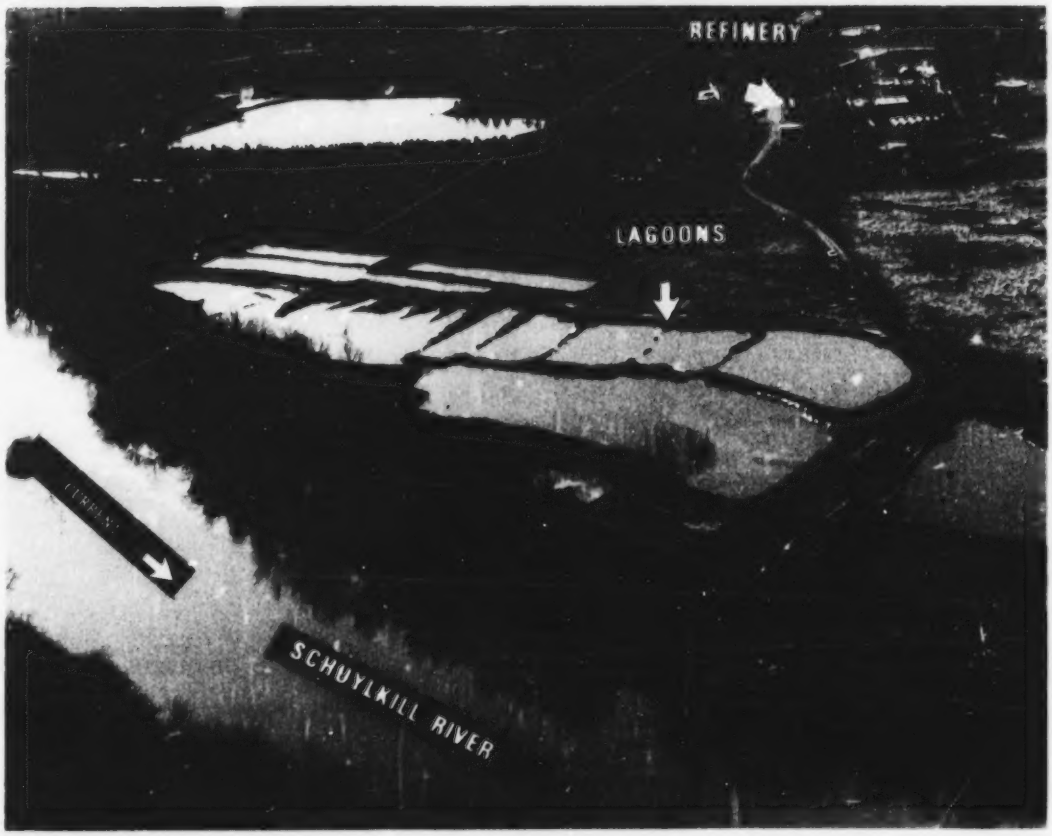
Some of the spillage which remained in the area was contained with booms, an earthen dam, and a chain link fence lined with straw. It was then cleaned up with vacuum trucks, straw, and other absorbing materials or sorbents. The Federal Water Quality Administration, which preceded EPA in spill response, activated the Regional Response Team within half an hour after the spill in accordance with provisions of the National Contingency Plan. The oil company paid for the direct damages and cleanup.

Worker at vacuum truck during tank farm spill.

Most spills at both large and small terminals and elsewhere are not as large as this one fortunately, since there are an estimated 10,000 spills a year. About 2,000 of these are fairly large spills.



Processing plant for drain oil, with its storage lagoons of sludge residue.



Breaks in dikes during heavy rainstorm in 1970 caused a major oil spill on the Schuylkill River in Pennsylvania.

A large number of the water-polluting spills in the past have been caused by carelessness, poor planning, or inadequate systems engineering and maintenance. Some recent improvement has been made in this. Until just a few years ago a large percentage of the oil spilled would not be contained or removed. It would remain in the environment. An example of a typical small spill might be a cinderblock wall falling on a rusty pipe at an oil storage facility and allowing the oil to discharge into a creek or river. All too often it would not be noticed or reported in time for containment or removal.

SCHUYLKILL RIVER SPILL--1970

Delayed reporting of large spills greatly complicates the difficult tasks of containment and removal. The Schuylkill River spill of 1970 occurred after an earthen dike holding a lagoon of waste crankcase oil sludge broke open shortly after midnight during a heavy rainstorm. It was not observed and reported until several hours later when 3 million gallons of the contamination was floating down river.

Containment and cleanup measures recovered some of the oil. Most of it floated on down the river which runs through Philadelphia and into Delaware Bay and the Atlantic Ocean. It was a classic case the study of which has given the

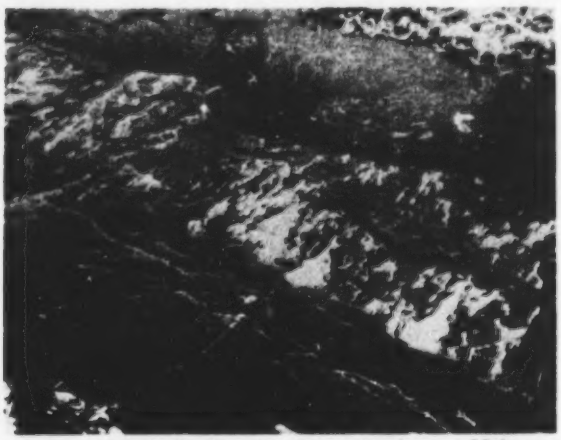
Workboat near oil containment boom during the Schuylkill River spill of 1970.

Environmental Protection Agency and others many lessons in spill response. In late 1970 the Federal Government was in a position to take action although fully coordinated and effective response measures and plans with all Federal, State, and local agencies cooperating, were not in operation.

Almost all air and water pollution eventually reaches the sea. Oil spills directly into the sea usually result from tank cleaning and bilge pumping on tankers and other vessels, from accidents, including collisions and groundings, from oil well blowouts, and from other sources. Among the most dramatic spills at sea are offshore oil rigs flowing out of control. These are often called blowouts or wild wells.

SANTA BARBARA SPILL--1969

In 1969 a high-pressure gas and oil well blew out in the Pacific Ocean off Santa Barbara releasing over 700,000 gallons of crude oil into



Oil on beach during the Santa Barbara offshore spill in 1969.

the channel. It drifted onto beaches and other coastal areas and into harbors and marinas. Cleanup measures of many types were attempted.

The blowout caused the gas and oil to escape from hydraulic fracture and through natural faults in the ocean floor. This lasted for over 300 days and caused millions of dollars of direct and indirect damage. Statements made by the President and by the Secretary of the Interior pointed to the need for preventing such occurrences in the future.

All wells were closed and drilling halted in Federal water in the Santa Barbara channel. A broad review of all Outer Continental Shelf regulations was made and new regulations were developed. The two-mile buffer opposite the Santa Barbara State Oil Sanctuary was made into a permanent ecological preserve and a new buffer zone was added.

GULF OF MEXICO SPILL--1970

Another major spill incident involving an offshore platform occurred in the Gulf of Mexico near the Louisiana coast during late 1970 and early 1971. Four lives were lost and several men injured. The oil company responded rapidly in water and shore cleanup, while drilling eleven relief wells to stop the flow of oil from the underground reservoir. The Federal Government also responded using available resources to coordinate the spill control and to minimize the effects of the disaster. The fire was allowed to burn off as much flowing oil and gas as possible to reduce pollution. The platform

itself was totally destroyed by the intense fire which lasted 136 days.

The final accounting in an ecological sense remains unsettled. Testing was conducted in an effort to assess the immediate damage, although

Offshore oil and gas spill near the Louisiana coast in 1970-71.

the effects caused by individual spills in this area of the Gulf are complicated by pollution stresses over the years from other sources. Extensive oil exploitation and production activities have been conducted in this region for

Pollution from Hurricane Camille damage near Gulf of Mexico.

several decades and spills, large and small, have occurred over the years in addition to day-to-day production discharges. All this, in addition to spills resulting from storm destruction of large oil storage tanks in the major hurricanes of the past several years, has contributed to a possible buildup of certain oil and hydrocarbon pollution.

TORREY CANYON SPILL--1967

In the rest of the world as in the United States oil tanker collisions, founderings, and sinkings account for water pollution from time to time. The *Torrey Canyon* ran aground and broke up off the southern coast of England in 1967 with some 30 million gallons of crude oil. Although every effort was made for two months to combat the tremendous quantities of floating

Tanker Torrey Canyon aground on Seven Stones Reef off the southern coast of England.

oil the accident was totally unexpected and control measures were experimental and inadequate. The slicks were attacked and bombarded from aircraft and surface vessels with bombs, napalm, sawdust and straw, hydrophobic chalk, and detergents. In spite of all these efforts the environmental effects were disastrous. Beaches, harbors, and coastal areas were especially affected.

OCEAN EAGLE SPILL--1968

In 1968 the Liberian tanker *Ocean Eagle* with 7,500,000 gallons of Venezuelan crude oil went aground in the harbor of San Juan, Puerto Rico just outside the bar channel. The vessel broke in two, rupturing several tanks, spilling crude oil into the harbor and contaminating beaches and other areas. Mr. Ken Biglane, then head of what has now become the EPA's Division of Oil and Hazardous Materials, met with U.S.Coast Guard, Navy, and marine technologists. Following his advice, it was decided that the oil remaining in the two sections of the vessel would have to be offloaded. Army Engineers negotiated an agreement for the removal of 2,500,000 gallons of oil and for the disposal of the stern. Navy salvage teams were given responsibility for the bow.

Tanker Ocean Eagle aground in San Juan harbor.

The entire salvage operation had to be completed before the weakened tanks or a sudden storm poured more oil into the sea or shifted the bow into the channel. The Commonwealth of Puerto Rico had every available man working to clean beaches and save property from further damage.

Chemical detergents were tried, but it was found that they were worse for the marine life than the oil, which had already killed numerous fish and other wildlife. The Commonwealth then insisted on the use of floating sorbents, boats

Detergents were tried and discontinued as harmful during Ocean Eagle spill.

and skimmers, vacuum trucks, hand labor, and mechanical cleanup methods. These were among the lessons learned and experiences resulting from this spill. The need for better navigation and port facilities and higher standards of performance for equipment and personnel are usually mentioned after any spill of this type.

GOLDEN GATE SPILL--1971

Another tanker spill occurred in San Francisco Bay. On a foggy morning in 1971 two tankers collided near the Golden Gate Bridge, discharging 715,000 gallons of bunker oil. The

Oil tanker collision in fog caused spill near Golden Gate Bridge in San Francisco.

oil spread rapidly, and over 5,000 volunteers joined in removal and restoration activities. Young and old showed their concern by helping to collect and clean birds, remove oil and debris, construct and place booms to stop oil from entering lagoons and other areas. Most of the Bay area marinas were affected, soiling about 1,000 boats. Skimmer equipment picked up some of the oil floating on the Bay.

OCEAN VESSEL OIL SPILL PROBLEMS

There have been other tanker spills since this and they can be expected to continue for several reasons. The world's tanker capacity doubled from 1960 to 1970 and is still increasing. New oil-energy demands are calling for new supertankers and their facilities, to receive oil from Alaska and additional oil imported from other world sources. Along with the rapid growth of the world's tanker fleet will come the inevitable increase in tanker-related spills. In contrast with rapid growth in the use of oil, the world is making slower improvement in tanker navigation practices and tank cleaning methods.

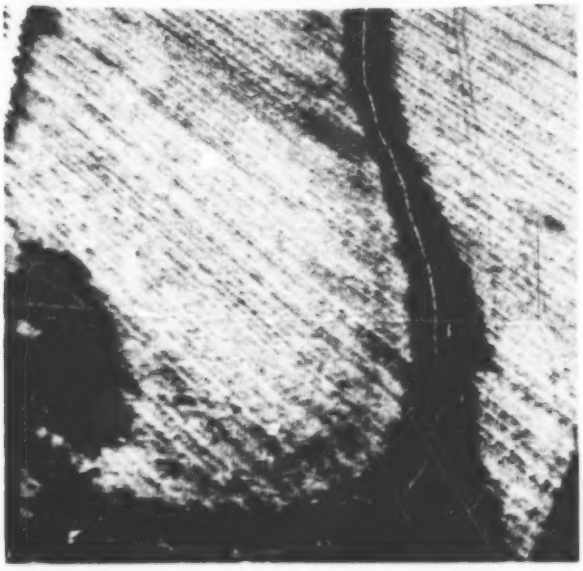
Tank cleaning practices for tankers and bilge cleaning methods on vessels are receiving increased attention. The Environmental Protection Agency is encouraging the load-on-top method for cleaning tanks at sea, better tank cleaning facilities at terminals, and other clean-water practices for tankers. Some of the large fleets are now using the load-on-top technique. This means that a properly equipped tanker carrying 30,000,000 gallons of crude oil

can avoid washing 150,000 gallons of it into the sea after each delivery.

Large, 75-million-gallon supertankers are now in operation and tankers with a capacity of 150 million gallons are under construction. Spills will be proportionately larger when these ships are the victims of unforseen circumstances or accidents at sea. Some of the older practices should be examined and phased out in favor of those which protect the environment from needless oil spills. The Environmental Protection Agency is working at both domestic and international levels toward the adoption of better techniques and equipment to cut down on the present and potential pollution by tankers and other vessels.

PIPELINE SPILLS

Broken pipelines and other pipeline incidents cause about 1,500 spills a year, totaling a million gallons of oil. Leaking underground lines may cause pollution for years without attracting much attention. Some breaks can be observed indirectly, as when snow conditions



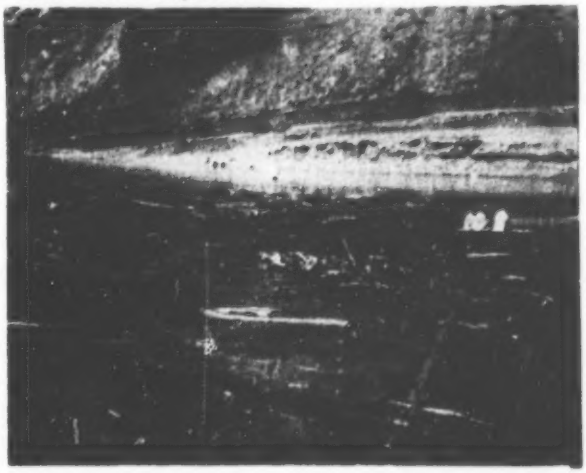
A form of pipeline spill observed from the air.

prevail. Many of the smaller lines in oil fields and the piping in plants and terminals are frequent spill sources. Some of the older industrial pipelines, and oilfield pipelines, flowlines, and gathering lines are not cathodically protected against corrosion. Electrolytic corrosion is a common source of rupture in pipelines. Present Department of Transportation regulations call for cathodic protection of interstate pipelines. They do not apply to thousands of miles of intrastate pipelines.

There are many other causes for pipelines to break or leak. Contact by earthmoving machinery may rupture buried lines. Underwater damage by a dragging anchor may result in spills from offshore pipelines.

SAN JUAN RIVER SPILL--1972

Men and equipment cannot be quickly deployed at the present state-of-the-art to meet every conceivable spill emergency in all types of terrain. In October 1972 a broken sixteen-inch pipeline spilled over 285,000 gallons of crude oil into the San Juan River in New Mexico and southern Utah. The river flows through isolated and rugged land. Unfortunately this spill threatened the waters of an Indian reservation and a national recreation area. Several days passed as heavy rains, near-record floods and snowstorms delayed spill containment, removal, and debris disposal.



San Juan River covered with oil and debris.

The spill continued to move downstream in spite of the efforts of the pipeline company with assistance from the Environmental Protection Agency; the Pacific Strike Force of the U.S.Coast Guard; the Bureau of Reclamation; the Bureau of Land Management; the Department of

Containment and removal of some oily debris from the San Juan River.

the Army; the National Park Service; the U.S. Geological Survey; the Bureau of Indian Affairs; the Navajo Tribe; the State of Utah; and the Federal Aviation Agency. Several miles of the San Juan River and portions of Lake Powell were affected. The major part of the oil was eventually removed from the water by the pipeline company.

OTHER OIL SPILL PROBLEMS

In addition to water pollution as a result of pipeline incidents many inland oil spills are the result of barge, tank car, tank truck and other accidents. River barges, rail tank cars and highway tank trucks are indispensable in our economy. Every day they haul millions of gallons of crude oil, diesel and heating oil, gasoline, and other products. Some of them are involved in collisions and other accidents resulting in oil spills.

Personnel and equipment failures in loading and transfer operations such as overfilling and broken valves, connections and hoses also cause spills. Oil and Hazardous Materials personnel of Environmental Protection Agency regions responded to hundreds of these spills in a recent year.

Fire hazards are often coupled to the pollution problem, making it difficult to save human lives and protect the environment at the same time. The first consideration being to protect human lives from fire and explosions, fire fighting personnel often neutralize or hose down and dispose of the volatile and flammable materials as fast as possible. This frequently results in polluting materials being washed into sewers, rivers, and harbors. EPA has a role in providing some leadership in an effort to insure that technical expertise and assistance are furnished to those who must cope with spills involving fires and water pollution. These and other areas of work in spill

Polluting materials are frequently washed away instead of being removed.

containment and removal are both challenging and rewarding. Better equipment design, maintenance, training, and alertness can prevent many spills. Spill containment and removal procedures need constant improvement and the knowledge and tools should be readily available to those who must respond to these emergencies.

Technical films, manuals, and visual aids are required to keep the entire spill-response community up to date on latest developments.

Response is always difficult even under so-called routine conditions. Sometimes it is almost impossible. A barge loaded with gasoline broke loose from its tow on the Ohio River and drifted for several miles before striking an electric power site and catching fire. The flames destroyed the barge and the power complex. Fire fighters and spill personnel were relatively helpless under these extreme conditions.

These examples were selected from the thousands of oil spills which have occurred in the past few years. They tell little about another problem: spills of hazardous substances, which are extremely significant in terms of their immediate and long-term threat to human life and the environment.

SPILLS OF HAZARDOUS SUBSTANCES

In sharp contrast to a shipwrecked oil tanker or an oil well blowout, a major hazardous spill could involve as little as one gallon of poison.

ENDRIN SPILL--OHIO

An example of this was an Endrin spill in 1971 at Shawnee Lake, Ohio. A man who had been denied permission to swim in the lake poured one gallon of an Endrin mixture into it. The deadly poison killed all aquatic life in the lake and caused it to become a menace to nearby human and animal life.

In response, Region V of the EPA cooperated with the State of Ohio and offered timely suggestions and service through its available expertise and resources. EPA activated an emergency contract and brought in a consultant team to assist its own Regional and National hazardous materials personnel and those from the State.

Drainage from the lake was dammed off and pumps and pipes installed to allow the water inflow to bypass the lake. A small pilot plant was built on the spot to test the feasibility of filtering the water through activated carbon. The test was a success and a larger plant was built using a filtering box

Shawnee Lake after Endrin spill.

supplied by EPA's regional warehouse in Cincinnati. It was converted into a lake water treatment plant using activated carbon as a filter according to the specifications based in large measure on the pilot plant studies.

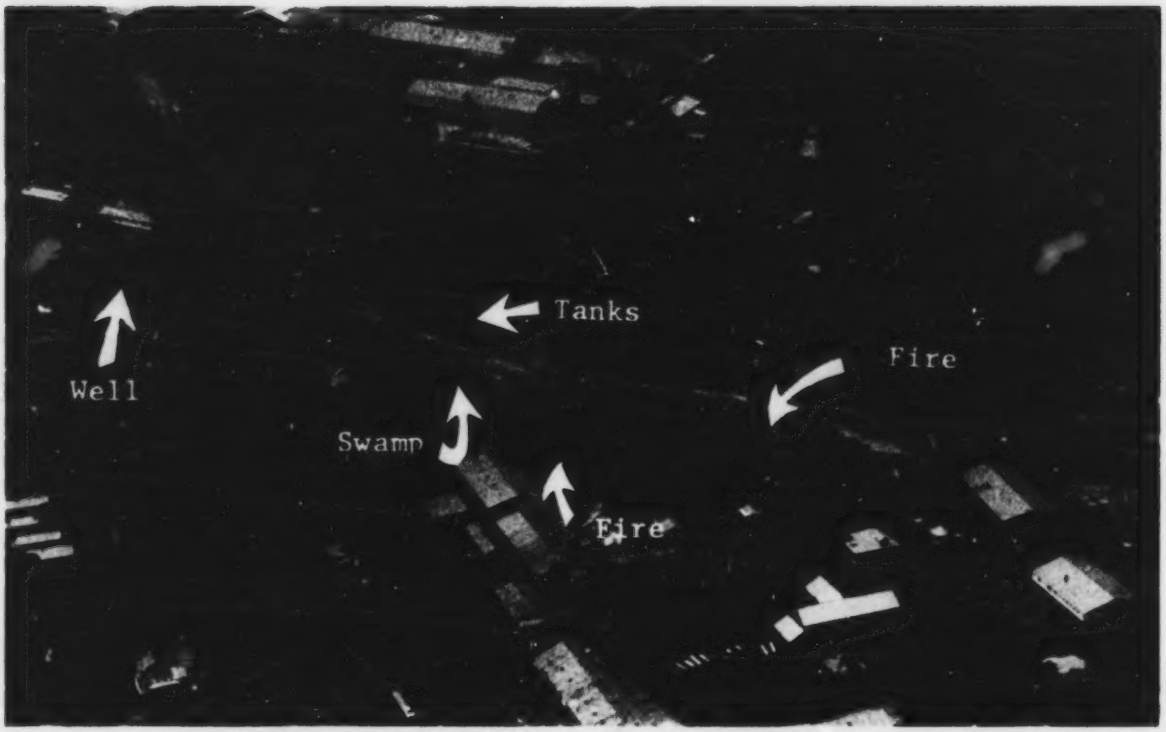
The water from the lake was then pumped through the carbon filter plant and purified at the rate of 250,000 gallons a day. After the lake was drained the bottom sediments were cleaned and fresh water allowed to flow in. The lake was restocked with fish and is again a safe recreational asset to the State of Ohio.

Many other hazardous spills threaten the environment. There are literally thousands of hazardous substances, and the means must be available to prevent or to cope with a spill of any one or a combination of them. Cooperation and advance planning or contingency planning are helpful and some lessons can be learned from past spills.

PESTICIDE WAREHOUSE--1971

In June 1971 a large agricultural chemicals warehouse in North Carolina caught fire and burned to the ground. State and local groups obtained the assistance of the EPA to mitigate any water pollution damage. In this case not only the aboveground water resources were threatened, but the underground water supply as well. In turn the health of the residents of Farmville was at stake.

This hazardous spill started as a fire. Tons of solid pesticides and insecticides, as well as liquids in exploding and burning containers mixed with the water used in fire fighting activities. It threatened to penetrate into the subsurface ground water. This



Agricultural chemicals warehouse fire in Farmville, North Carolina, was located near the city well. Runoff water from the fire was caught in a small swamp and placed in plastic tanks, protecting the well from seepage.

could then poison a well located a few hundred feet away which is a major source of water for the city.

During the fire it was suggested that the contaminated water be contained on the site in a small swamp which could be quickly dammed off. This was done, and much of the runoff water from the fire was caught.

Regional offices of the Environmental Protection Agency responded to assist the groups already involved. No easy remedies or ready-made solutions were available for the disposal of the highly toxic liquid and solid residues from this fire. It was clear that none of the potent mixture of over 60 hazardous substances should be allowed to contaminate the nearby water supply.

To keep the poisoned water at the swamp from soaking into the ground, large plastic-lined troughs were built and filled through hose lines from the swamp. The urgent ecological problems of ultimate disposal of the solids and liquids were complicated by real economic problems such as the cost, time. and a suitable location for dumping or neutralizing the residues.

These problems were finally resolved when first the solids, then the liquids were transported to an isolated burial site. A limestone bed was prepared to neutralize the organophosphate pesticides. Underlying clay was used to sorb the chlorinated hydrocarbon materials. These burial pits were mounded over, seeded, marked or tombstoned on the surface of the ground, and well-points installed. Similar well points were placed near the city well and all were to be monitored at future intervals to see if there were any significant amount of pesticide leaching into the subsurface waters.

Solid and liquid residues from fire were buried in clay over beds of limestone.

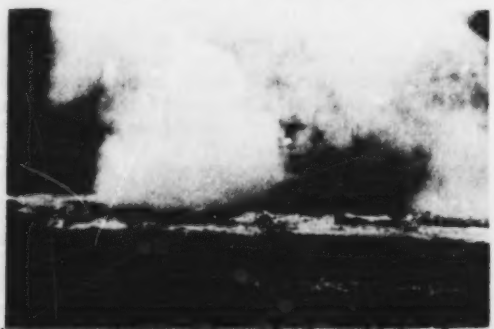
RAIL ACCIDENT--CHEMICALS

Another incident, caused by a 15-car train derailment, occurred during a downpour in Alabama in December 1971 near a tributary to

Chemicals were spilled in this train wreck.

the Alabama River. Four of the cars spilled the herbicide Atrex, two spilled concentrated sulfuric acid, and one spilled carbon disulfide.

The railroad cleanup crew responded promptly and effectively with containment, neutralization and disposal of a complex mixture of chemicals and thick mud. The runoff area was diked and neutralized where necessary with limestone and a disposal pit was prepared in a clay strata. The scattered and partially burned herbicide was placed in the pit and the free concentrated sulfuric acid was drained into it, causing a reaction which partially detoxified



Limestone mixing with sulfuric acid in cleanup.

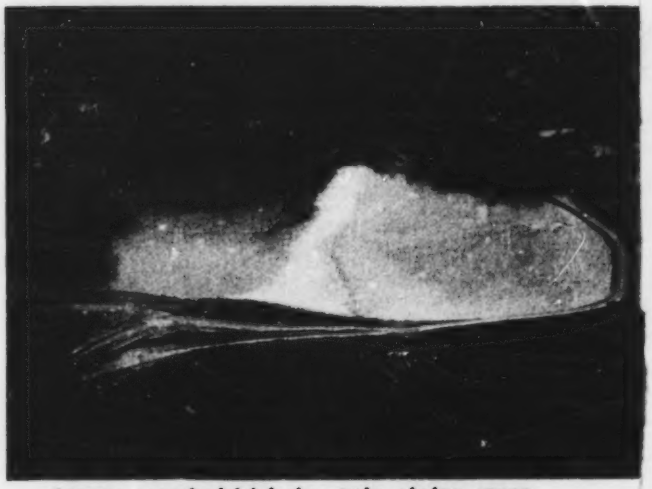
the combination. Limestone was then introduced to neutralize the remaining acid and the pit was sealed with a mound of clay.

The main line was reopened within 24 hours and it took about four days of concentrated effort by the railroad to complete the entire operation. This is another example of many in which good response programs have demonstrated that transportation accidents can be addressed to protect the environment. On occasion materials can be saved such as the 45,000 pounds of the herbicide Atrex as was the case in this instance.

STORAGE LAGOON SPILLS

Spills caused by the failure of storage lagoons containing hazardous substances--such as a strip mining lagoon in West Virginia in 1972--can take scores of human lives when conditions are extreme.

In the strip mining areas it is customary to concentrate water from coal mining operations in large ponds high in the mountains. The dark water contains acidic and toxic wastes and coal fines. It is intended to settle and clarify there and pass into lower lagoons or ponds. The dams are frequently made of waste material from strip mining. In



Lagoons perched high in strip mining areas.

February of 1972 heavy rainfall and melting snow overfilled one of the ponds and eroded a small dam on the upper level. The dam failed, cascading water into the lower and larger ponds bursting dams as it went.

The result was a wave of polluted water which crashed down a narrow, populated valley destroying small towns in its path and killing over 100 people.

Lagoon after dam failure.

A wave of polluted water from lagoons crashed into narrow valley claiming over 100 victims.

On the Peace River in Florida in 1971 a large storage lagoon containing two billion gallons of sludge from phosphate mining operations was released. It polluted the Peace River for 60 miles from Punta Gorda to the Gulf of Mexico. Spills of this type are

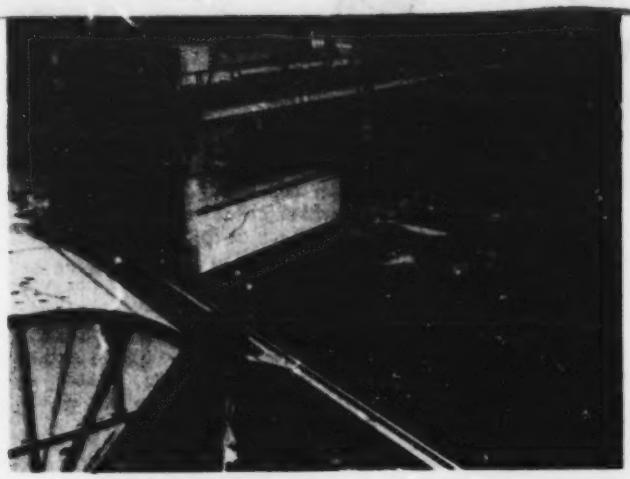
Peace River, Florida, after lagoon spill.

harmful to life in and along the river and affect recreational activities. In addition they often carry a foul odor which detracts from the enjoyment or profit of thousands of people and businesses.

In the Denver-Lonomont area and again at Julesburg, Colorado, the South Platte River was recently polluted by over one million gallons of pulp and waste from sugar processing lagoons. The serious impact of earthen dam and lagoon failures leaves no doubt that more attention must be given to this urgent problem.

LOUISVILLE CHLORINE INCIDENT

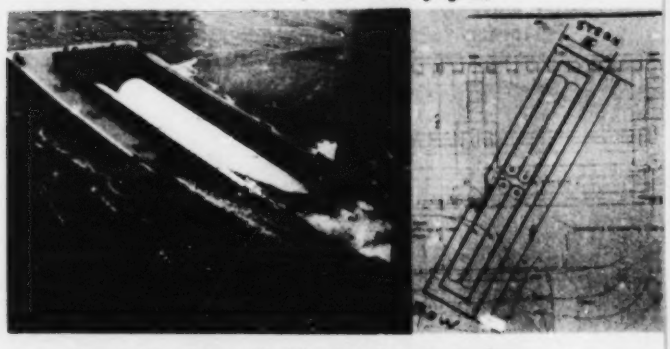
A near-catastrophe occurred in March 1972 on the Ohio River at Louisville, Kentucky when a barge loaded with 640 tons of liquid chlorine broke its towline and drifted backward in a 15-mile-an-hour current. Carrying a cargo of potential poison gas, it punctured its hull as it struck the dam at a hydroelectric complex.



Drifting barge with 640 tons liquid chlorine struck pillar at McAlpine Dam near Louisville.

Fortunately it struck a concrete pillar before it began to move over the dam. Some of the momentum of the barge was spent as it hit the pier and caved in the pillow tank on the side, before the river current picks up speed from 15 to 50 miles per hour as the water squeezes past the piers and rushes down the spillway.

As the barge had already struck the huge pillar it took a smaller impact when it was pierced by the submerged energy diffusers inside the spillway. They were not able to open up the bottom of the hull and rupture any of the four 70-foot-long chlorine tanks. If one or more had ruptured a lethal, low-clinging gas cloud could have drifted into nearby Louisville just downwind, killing thousands. The tanks held and the problem remained of containing and removing the deadly gas.



Vertical views of chlorine barge at dam.

In the days that followed, the Army Corps of Engineers, the U.S.Coast Guard, the Environmental Protection Agency, and other groups sought and found solutions to a wide variety of problems connected with alleviating this situation.

Because the barge was so heavy, a large salvage catamaran was brought in and secured to it by strong cables. This would hold it fast and keep it from breaking loose in high water. Meanwhile a water containment curtain

was installed at the suggestion of the EPA. The water curtain was a high-pressure spray directed down from the superstructure of the dam toward the nozzles of the tanks on the barge as a last-ditch measure. It was to be used in case of a sudden chlorine leak to push any escaping gas back into the water.

Air and water monitors for chlorine were set up and part of the city was evacuated. Finally the time came for offloading and neutralizing the chlorine from the barge. It was the last critical phase of a tense 24-hour-a-day situation which lasted for nearly a month. After this operation was completed, the case was closed.

HURRICANE AGNES SPILLS OIL AND HAZARDOUS SUBSTANCES

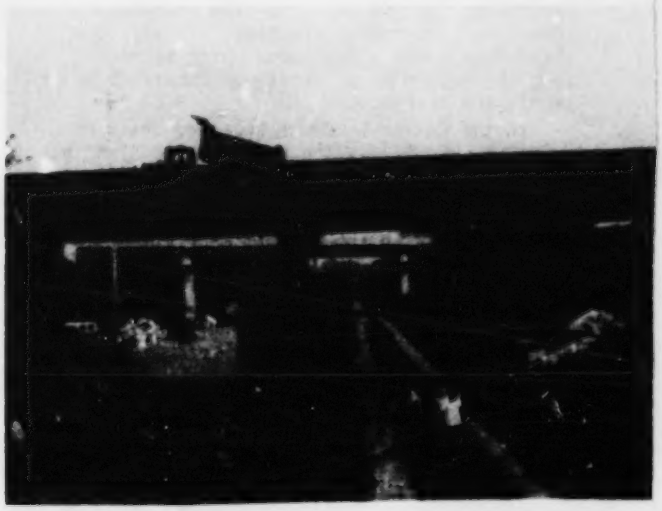
Nature often causes spill problems. In June of 1972 Hurricane Agnes lashed up from the Gulf of Mexico causing severe floods in several river basins over the eastern half of the United States. In her wake she left scores dead, thousands homeless, and caused property damage in the billions. Water pollution caused by spills of oil and hazardous substances was general and widespread. The EPA, together with other Federal, State, local, and private agencies worked long and hard to restore clean water supplies. Large quantities of floating oil were on the loose, as well as thousands of drums of oil, chemicals, and other materials. Specialists from the Environmental Protection Agency and from industry provided timely and valuable technical assistance in the oil cleanup and in the identification and removal of drums and containers from the disaster areas.

During the same Hurricane Agnes some oil-storage lagoons along the Schuylkill River which caused a spill in 1970 were inundated. This time 6 to 7 million gallons of the floating black sludge was released. Carried by the flood water it penetrated high ground and damaged or ruined farms, homes, and businesses as it swept down the Schuylkill and kept cleanup squads busy for months.

During Hurricane Agnes oil and sludge in flood waters penetrated high ground over a wide area.

EPA assisted in identification and removal of chemical containers after Hurricane Agnes.

Oil and debris cleanup and removal was an almost endless task with many problems for the disposal crews. The waste material after collection was really not welcome anywhere and many delays were encountered in finding a suitable location for dumping it. The material finally went into dump trucks and railroad hopper cars before disposal at a commercial landfill.



Disposal of oil, sludge and debris from spills is complex because they are not welcome anywhere.

RESPONSE, PREVENTION, ENFORCEMENT

The goals of EPA are to eliminate the spills, reduce discharges resulting from operational practices and minimize the impact of spills on the environment. To accomplish these goals, a three-phase program has been developed by EPA and the Department of Transportation for implementation by EPA, the U.S.Coast Guard and the Office of Pipeline Safety. The program includes response, prevention and enforcement.

Whether at Pottstown, Shawnee Lake, Louisville, or in the Imperial Valley of California, no two spills are alike. They frequently require the attention of teams composed of chemists, biologists, engineers, and others whose goal is to soften the impact of the spill on the environment. At the same time the news media and the public must be kept informed.

EPA Administrator William D. Ruckelshaus is interviewed by newsmen during his survey of Hurricane Agnes oil spill damage in 1972.

In addition to response actions by regional teams, EPA has established emergency response contracts with technical organizations in private industry to provide support to Regional Offices during major spills.

During a recent year EPA provided on-scene coordination or advice on 60 percent of the major incidents. The continuing success of the response program is dependent upon rapid action at the State and local levels. Many coastal States now have response programs, and EPA is encouraging all States, local agencies and port authorities to develop similar programs.

OHM-TADS COMPUTER ROLE

Spills of toxic and hazardous substances, as myriad and complex as they can be, sometimes require that men and computers work together to obtain fast solutions to urgent problems. A recent example of this took place when a tank truck overturned with a load of styrene. The material spilled out and blocked a major highway. The traffic was backed up for miles while police, firemen, and local cleanup crews groped for information on how to safely handle the material.

A phone call was then made to the Division of Oil and Hazardous Materials at EPA requesting assistance on procedures for safe handling and cleanup of the spilled material. In less than 15 minutes all pertinent information and

Computerized data bank is capable of providing printouts for assisting in fast spill response.

details were given with the aid of the OHM-TADS [Oil and Hazardous Materials Technical Assistance Data System]. Interrogation of the on-line computerized data bank provided a printout which was immediately checked over by a spill-response expert and relayed to the cleanup personnel. The OHM-TADS techniques and equipment are fairly recent innovations which are being utilized and strengthened to provide a network of data for emergency service to spill response personnel all over the nation.

CONTINGENCY PLANNING

Preparedness or contingency planning is another means of mitigating the effects of spills. The Federal Government has prepared the National Oil and Hazardous Substances Pollution Contingency Plan. Other contingency plans, to be implemented by fast-moving and effective response teams, are prepared by EPA Regions, States, localities, port authorities, and industrial facilities. They spell out what can and should be done for many types of spills.

Contingency plans--vital to good spill response.

Under the terms of the National Contingency Plan, EPA maintains the lead role in providing advice on environmental priorities, cleanup techniques, and serves as on-scene coordinator for inland spill incidents. The U.S. Coast Guard designates the on-scene coordinator for coastal spills. EPA is also responsible for continuous updating and revision of the Plan and for providing a Chairman for inland-spill and regular meetings of a special group of spill-response experts called the National Response Team. Members of this Team represent various Federal Agencies such as EPA, the U.S. Coast Guard, Office of Emergency Preparedness, and others.

People at EPA are also perfecting and coordinating the work of the National Response Team for spills in addition to refining and coordinating contingency plans. They urge the adoption of needed improvements in production, transportation, and storage facilities for all polluting substances. This extends into better rules, regulations, and equipment to prevent, detect, control, contain, and remove water-polluting spills.

Cleaner operations are needed in the extraction, storage, refining, and transportation of oil and hazardous substances. EPA is constantly involved in these problems--even though they include everything from international agreements and conferences, to retraining oil and chemical handlers.

EPA is involved in many other aspects of actual and potential oil and hazardous spills. The hazardous substance field is extremely complex because of the large number of potentially dangerous chemicals and elements which are in use today and are anticipated to increase in the future.

SPILL PREVENTION

The most promising solution of the oil spill problem is through prevention. Regulations to prevent oil spills are currently being developed by EPA, under the Federal Water Pollution Control Act Amendments of 1972. The Act stresses the need for regulations that encourage planning to prevent pollution, not for regulations that describe how each facility must do this. In the proposed regulations, the facilities that spill 1,000 gallons or more in a single incident, or two smaller spills within any 12-month period, will have their spill prevention plans certified by EPA and processed through the State. The new Federal law has provisions for enforcement.

With the promulgation of the oil prevention regulations, an active program will be initiated for non-transportation facilities. Efforts will be directed toward post-spill inspections to determine compliance with regulations.

Fail-safe design requirements appear to be essential to the development of effective programs at some installations. Studies are being made for facilities and Federal installations' handling, storing, manufacturing and transporting oil and hazardous materials. Findings will be used to assist in the preparation of guidelines, regulations, manuals and model codes.

EPA training seminars are held at the local and other appropriate levels to keep responsible and interested persons abreast of new spill-prevention technology and to minimize discharges. This program provides for a constant exchange of prevention information in the form of manuals, films, exhibits, visual aids and other materials.

Certainly the need for preventing water-polluting spills cannot be over-emphasized. An encouraging sign is the growth of public interest in ecology and the environment. Today's television programs and news articles stress the need for spill prevention, reflecting a constructive attitude which has reached into many segments of world opinion and industry.

There is a need for fair and workable laws and regulations concerning spills. Without them the number and size of spills will continue or even increase. The EPA has been in the process of promulgating regulations for the prevention of spills at non-transportation related facilities.

EPA's Division of Oil and Hazardous Materials is providing the technical lead and the program emphasis to develop regulations for oil and hazardous substances as required by Section 311 of Public Law 92-500 (33USC1251 et seq) known as the Federal Water Pollution Control Act Amendments of 1972.

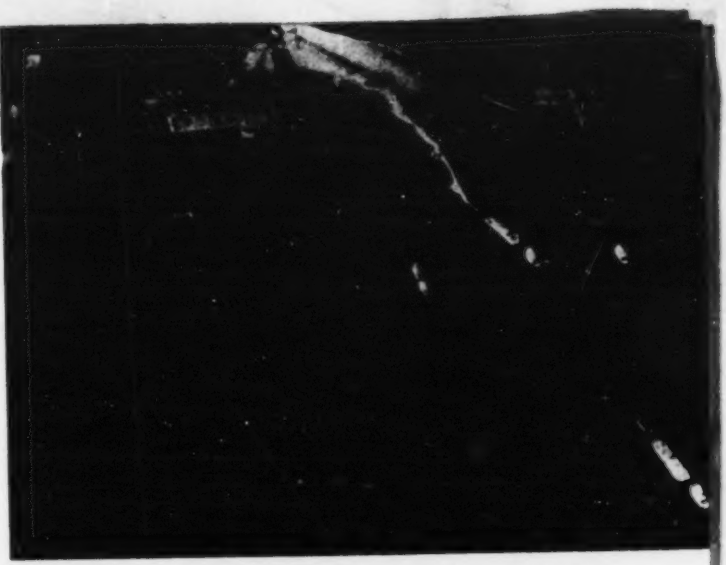
For oil, regulations establishing harmful quantities and criteria for local and regional contingency plans have been promulgated. Those establishing methods, procedures and equipment to prevent oil spills are almost completed. Regulations establishing methods and procedures for removal of discharged oil are being drafted.

For hazardous materials some seven areas of regulation are being addressed. These are: a definition of hazardous substances and a determination of removability; a determination of what constitutes a harmful quantity; the development of rates of penalty for non-removable materials; specific methods of removal or cleanup; specific procedures and equipment to prevent spills; a determination of non-harmful quantities; and the development of liability limitations for several facilities.

SPILL SURVEILLANCE

Even with adequate laws and regulations, spills will probably continue to occur and they must be detected quickly and controlled. Spill surveillance, detection, reporting, and tracking are useful in legal proceedings resulting from spills. They are also of assistance in containment and removal operations. It is essential to have good methods and plans to discover and clean up the small spills. To allow a great number of them to go unnoticed would cause severe damage to the environment. It is even more important to keep track of the larger spills such as those resulting from tanker accidents, offshore oil well blowouts, storage lagoon failures, catastrophic storms, and pipeline failures. These can spread out over wide areas of water and cause great damage.

The Environmental Protection Agency is developing surveillance tools such as multiband imagery by high-altitude aerial platforms including aircraft and satellites. Aerial photography, infrared sensors, and other types of equipment for detecting and measuring spills are of help here. The Division of Oil and Hazardous Materials, EPA, together with the National Environmental Research Center's flight facility at Las Vegas is working on the utilization of such tools. One of the major roles in surveillance is to keep track of the movements of the larger spills. In the case of the offshore oil well blowouts, weather conditions often preclude removal of oil from the sea on certain days. The skimmers cannot operate in rough seas.



Skimmers attempt to recover floating oil during offshore oil well spill.

Surface winds and currents change frequently, moving the slicks off in different directions. In cleanup operations from offshore oil well blowouts a fresh start may be needed each day, making it necessary to determine where the floating oil is. Low-flying light aircraft and helicopters are frequently used for surveillance. They are sometimes supplemented by heavier airplanes using remote sensing equipment to provide better information and aid spill cleanup.

CONTINUING EFFORTS

Communicating and alleviating the spill problem in a workable, helpful way with the cooperation of industry, government, and the public is a never-ending task. It calls for patient understanding and much more hard work. The cases discussed here in the brief space available represent only a few examples of the concern of international, Federal, State, community, and industrial groups and their cooperation in coping with spills of oil and hazardous substances.

Groups of nations, the United States and many States, localities, port authorities and industries are now involved in perfecting and interrelating prevention and response plans. These and other continuing efforts should permit more effective and efficient action to be taken to prevent and control future spills of oil and hazardous substances.

INTERNATIONAL COOPERATION

Many nations recognize that the broadening and strengthening of cooperative programs are essential if countries are to deal effectively with the problem of global pollution. Although the primary efforts of EPA have been directed to response and prevention of spills in United States navigable waters, significant steps have been taken at the international level to reduce discharge and spillage into the oceans and boundary waters.

EPA provides input to the Intergovernmental Maritime Consultative Organization (IMCO) and to the UN's Joint Group of Experts on the Scientific Aspects of Marine Pollution(GESAMP).

EPA provides experts to international meetings to reduce discharge and spillage into the sea.

EPA participates in international activities dealing with tanker operations, design, ocean dumping, designation of hazardous substances, technology transfer, and other related programs. Through the U.S.Coast Guard and the Department of State, advice and assistance are provided to other countries and operational programs, such as those with Canada and IMCO.

With IMCO's expanding role to prevent operational and accidental discharges of oil and hazardous substances into the oceans, the efforts of the Environmental Protection Agency have been increased to provide guidance at the international level to insure compatibility of technical spill criteria with those of the United States.

President Nixon said in transmitting his 1970 Report to the Congress on Foreign Policy for the 1970s: "We know we must act as one world in restoring the world's environment, before pollution of the seas and skies overwhelms every nation."

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OIL SPILLS AND SPILLS OF HAZARDOUS SUBSTANCES

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Division of Oil and Hazardous Materials
Office of Air and Water Programs
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Washington, D.C. 20460

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